JUN 10 1936

AGRICULTURAL NEWS LETTER

VOL. 4 - NO. 6 JUNE 1936

THIS PUBLICATION GIVES INFORMATION on new developments of interest to agriculture based on the work done by scientists and agricultural field men of the du Pont Company and its subsidiary companies.

It also gives reports of results obtained with products developed by these companies in the field whether the tests are made by field men of the companies, by agricultural experiment stations or other bodies. Also data on certain work done by agricultural stations on their own account and other matters of interest in the agricultural field.

This issue contains:

A Combined Spreader and Sticker for Sprays that Possesses Various Valuable Properties

"Cellophane" Cellulose Film Has Definite Value as a Liner for Egg Cases Recent Tests Indicate

Iowa Corn Yield Increased by Dust Treatment Tests Conducted Over a Period of Years Show

New Industrial Uses for Agricultural Commodities Hopefully Expected by the Farm Chemurgic Council

Cleaning Out Soft Mud from Ditches in Marshes Done Successfully by a Newly-Developed Method

Issued by
Publicity Department,
E. I. du Pont de Nemours & Co.,
Wilmington, Del.

Printed in U.S.A.

A COMBINED SPREADER AND STICKER FOR SPRAYS THAT POSSESSES VARIOUS VALUABLE PROPERTIES

EDITOR'S NOTE:- This discussion by Dr. Tisdale outlines the development and application of an important assistant to the effectual uses of insecticides and fungicides. Experimenters will be interested in the offer of samples for use in their work.

By W. H. Tisdale, Pest Control Section,
Grasselli Chemical Co., Cleveland, Ohio.

Thoroughness of application of insecticides and fungicides is one of the most important factors in the satisfactory control of insects and plant diseases. This applies to both dusts and sprays. One of the important handicaps has been the use of inefficient spraying and dusting machines. Chief among the difficulties, however, has been the chemical and physical properties of the compounds used. Solubility, stability, compatibility with other products, particle size, and spreading and adhesiveness are important. These factors have not been given as much consideration as they deserve. However, more attention is being directed at the present time toward efficient application and maintaining of a satisfactory coverage of the toxic material. Definite progress has been made and, in view of the attention centered on these problems, further advancement is in prospect.

For the application of sprays many assistants or emulsifying, spreading and sticking agents have been employed. Soaps of various kinds such as the fatty acid soaps of the alkali metals, amine soaps, vegetable oil soaps, fish oil soaps, sulfonated oils, caseinates, blood albumen, rosin soaps, glue, soap bark, and other products have been used with more or less success. There has, however, been a recognized need for spreading and sticking agents with a wider range of usefulness than possessed by these products.

An Important Development

More recently certain sulfated phenol and naphthalene compounds and sulfated higher alcohols have been found to be very effective as wetting and spreading agents. They also are useful in stabilizing emulsions and rendering powdered fungicides and insecticides wettable. They are compatible with natural hard waters and weak acids and alkalies. There is a tendency, however, to use too much of these products. When used in excess with sprays the result is too much drip or run-off of the active ingredient. The

Continued on next page

remaining film has a tendency to wash off readily with rains. An attempt was made several years ago by the du Pont Laboratories to overcome this difficulty by combining the excellent wetting and spreading properties of one of the best of these compounds with a satisfactory sticking agent that would reduce the amount of run-off of the spray and prevent excessive removal by rains and other weathering factors. A resinous material was finally developed synthetically which does not have the disadvantage of producing a brittle film after drying. This synthetic resinous compound was combined with sodium oleyl sulfate with suitable blending agents to make a very effective combined spreading and sticking agent.

Various Advantages Offered

This combined spreader and sticker has the advantage of being a liquid and easy to use. Although it is not difficult to remove with warm water or with acid and alkali washes in the removal of poisonous residues from fruit, it is not washed off readily by rains. It also is fairly resistant to other weathering factors. When dried on the plant it forms a plastic film that is invisible and does not harden, crack and peel upon drying. It is compatible with most of the insecticidal and fungicidal sprays. It has been used successfully with very hard waters. It has the advantage of the sulfated higher alcohols in being compatible with solutions that are slightly acid or alkaline. It is non-injurious to plants when used in concentrations required for effectiveness. Even in higher concentrations than needed there is little likelihood of injury unless the plants are sprayed in wilted condition when spraying should not be done with any product.

This combined spreader and sticker has been used in extensive experiments throughout the country with applications of arsenate of lead, nicotine, derris, "Loro," selocide and pyrethrum insecticides, and with Bordeaux mixture, lime sulfur and other sulfur sprays. Its use experimentally is suggested with zinc sulfate, iron sulfate and other chlorophyl deficiency sprays as a means of obtaining satisfactory coverage.

Due to the high degree of efficiency of this product which is coded SS-3 only small quantities are required for most purposes. Only 2 to 3 ounces per 100 gallons of spray is needed for the application of arsenate of lead sprays. More is required for best results with contact insecticides. As much as one pound per 100 gallons has been used to advantage (1:800) although 1/2 pound or even less is effective in many cases. As a rule the effectiveness of contact sprays is increased substantially. With Bordeaux and lime sulfur and other sulfur sprays five to six ounces per 100 gallons of spray has proved adequate as a rule. The amount needed depends to some extent on the plant or insect to be wetted as well as on the kind of spray.

Continued on next page

How to Obtain the Best Results

For best results attention should be given to the method of mixing of SS-3 with fungicides and insecticides. It is generally best to dilute the spray material before adding SS-3. With Bordeaux mixture and lime sulfur, best results are obtained by mixing the SS-3 with several parts of water before adding to the diluted spray solution. It is not compatible with acetone extracts of derris. If added to hot solutions in concentrated form there may be some separation of the resinous material. It has usually not been found necessary to increase the amount of SS-3 when hard waters are used. With exceptionally hard waters an increase in amount may prove beneficial.

Results obtained with this product during the past three years have proved sufficiently encouraging to make it desirable to manufacture a limited supply for experimental commercial introduction and to make available ample supplies for further research. Samples will gladly be contributed to investigators for experimental purposes.

NOTE: - Requests for samples should be addressed to the Pest Control Research Division, Grasselli Chemical Company, Cleveland, Ohio.

"CELLOPHANE" CELLULOSE FILM HAS DEFINITE VALUE AS A LINER FOR EGG CASES RECENT TESTS INDICATE

EDITOR'S NOTE:- The tests reported below were made under the direction of R. C. Schilly in the Sales Service Laboratory of the Du Pont Cellophane Company and approved by A. F. Wendler, manager, Sales Service Section.

SUBJECT:

Evaluation of *"Cellophane" as a Liner for Egg Cases

OBJECT:

To determine the value of P. T. and M. T. "Cellophane" when used as liners in egg cases.

GENERAL

A number of egg case liners have been developed for use particularly where the commodity is stored for some period. The use of "Cellophane" seems to be indicated for this purpose due to the properties of the film.

Economically, the normal price difference between Grade A and Grade B eggs is about 10¢ per dozen, so an effective liner which will keep a greater number of eggs in the A grade during a prolonged storage period can easily justify its existence. Oil-treating, and methods of processing the individual eggs in such a way as to keep them without using a liner in the case during the storage period, are proving unsuccessful commercially, particularly from the consumer's standpoint. Several concerns who have used this process are definitely interested in an efficient case liner.

SOURCE OF MATERIAL

Four cases of eggs were purchased on the wholesale market. All were best grade "nearby" fresh laid.

Case liners made of moistureproof "Cellophane" were fabricated by the Central States Paper & Bag Company.

Liners made of P. T. "Cellophane" were hand fabricated in the New York laboratory.

Continued on next page

TEST PROCEDURE

Description of Liners

1. Liners made of moistureproof "Cellophane". Moistureproof "Cellophane" was spot glued to a sheet of kraft paper, the resulting combination being formed into large bags in such a manner that the moistureproof Cellophane was on the inside of the bags (liners). The primary function of the kraft paper was to lend additional strength to the liner and to prevent the Cellophane from becoming torn when in contact with the rough wooden sides of the egg cases.

2. Liners of P.T. "Cellophane" were made by fabricating large sheets of #600 P.T. film into bags the same size as those mentioned under No. 1. Seams were made as airtight as possible. P.T. "Cellophane" was not joined to kraft paper although this would undoubtedly be necessary in the event of commercial use.

Description of Test Units

One-half of each case was lined with:

1. P.T. "Cellophane" - 2 cases
2. M.T. "Cellophane" - 2 cases

Tops of all liners were folded in and sealed down with Scotch tape, care being taken to seal all open joints at the top of the liner.

Conditions of Test

1. All cases placed in cold storage for five months under conditions regularly used for egg storage.

2. End of storage period eggs removed to room conditions and allowed to stand for 2 days before candling.

3. After first candling, eggs were replaced in original compartments (lined and unlined) and allowed to stand for 8 more days before recandling to determine degree of deterioration at normal room conditions.

Description of Test Analysis

Before packing, all eggs were carefully selected by the candling method, being uniformly excellent Grade A.

Continued on next page

TEST PROCEDURE (CONCLUDED)

Original selection of eggs and part of the candling on first removing from storage was done by a commercial egg candler. Subsequently all candling was conducted by the official Government Grader of the United States Department of Agriculture.

DETAILS OF TEST RESULTS

Table I

Grading of Eggs After Five Months Cold Storage (2 days room conditions)

Case No.	Type of Liner in 1/2 Cs.	Candling	% Eggs Grade A	B	C	Loss Cracks	Rots
1	M.T."Cellophane"	Gov't	31.7	65.6	2.2	0	0.5
	Unlined	"	0	73.9	24.4	1.1	0.6
2 a)	M.T."Cellophane"	"	*10.6	81.6	5.5	1.7	0
b)	M.T."Cellophane"	Comm'l	66.7	30.0	3.3	0	0
	Unlined	"	0	76.7	23.3	0	0
3	P.T."Cellophane"	"	48.3	48.9	2.2	0.6	0
	Unlined	"	0	78.3	14.5	0	7.2
4	P.T."Cellophane"	Gov't	10.6	78.3	8.3	2.2	0.6
	Unlined	"	0.6	60.6	32.8	5.5	0.5

*Recandling 24 hours after commercial candling.

Table II

Grading of Eggs Held in Room Conditions for 10 Days After Cold Storage

Case No.	Type of Liner in 1/2 Cs.	Candling	% Eggs Grade A	B	C	Loss Cracks	Rots
1	M.T."Cellophane"	Gov't	10.0	87.3	1.6	1.1	0
	Unlined	"	0	63.9	35.6		
2	M.T."Cellophane"	"	2.2	82.8	11.2	2.2	1.1
	Unlined	"	0	75.5	21.7	1.7	1.1
3	P.T."Cellophane"	"	0	64.5	30.0	1.1	
	Unlined	"	0	60.0	30.5	1.1	
4	P.T."Cellophane"	"	1.6	85.0	10.6	1.7	1.1
	Unlined	"	0	55.6	37.2	7.2	

Continued on next page

Candling on removal from storage shows both P.T. and M.T. "Cellophane" lined cases will keep eggs in much better condition than where no liners were used. M.T. "Cellophane" was definitely superior to P.T. stock.

Results in Table II show the rate of deterioration is approximately the same for eggs in lined and unlined cases exposed for 10 days to room conditions after removal from cold storage. The eggs protected by "Cellophane" retained their relative superiority over those in the unlined cases.

Comment was made both by the commercial candler and the Government inspector that three different types of Grade B eggs were shown in this test when the eggs were removed from storage:

1. High grade B -- Cases lined with M.T. "Cellophane"
2. Medium grade B -- Cases lined with P.T. "Cellophane"
3. Low grade B -- Unlined cases.

A high grade B egg is commercially more desirable than a medium or low grade B, as the egg will, of course, remain grade B for a considerably longer period than the poorer quality of the same grade. This fact coupled with the higher percentage of grade A eggs occurring in the cases lined with moistureproof "Cellophane" lends a distinct commercial advantage to such a lining procedure.

The superior quality of eggs from cases lined with moistureproof "Cellophane" as against those lined with P.T. "Cellophane" was ascribed by both the commercial and Government candlers to the much smaller shrinkage (moisture loss) of eggs so protected. One of the principal factors in grading eggs by the candling method is the size of the air cells, this usually being directly correlated with moisture loss. The superiority of the liners made of P.T. "Cellophane" over the unlined cases is probably due to the prevention of air circulation in cases so lined.

When first opened for candling after storage, eggs in the unlined cases had reached normal room temperature. Those in cases lined with P.T. "Cellophane" were distinctly colder and showed condensation on eggs at the top of the case, while those in cases lined with moistureproof "Cellophane" were very cold and eggs throughout the case showed heavy condensation on their surfaces. This can properly be correlated with the prevention of air circulation and the moistureproofness of the liner.

It is claimed that the retention of such condensation on the surface of the egg might encourage mold growth and rotting in the egg. It did not show up in this test, however.

Table I shows a distinct difference in results secured by commercial candlers and Government candlers. This is explained by

Continued on next page

DETAILS OF TEST RESULTS (Concluded)

the strict adherence of the Government candlers to legal standards and the tendency of commercial candlers to shade these requirements in favor of the higher grade when the egg is near the border line between grades.

CONCLUSIONS

1. Egg case liners of M.T. and P.T. "Cellophane" keep eggs in a better condition than unlined cases during a five months cold storage period.

2. M.T. "Cellophane" is distinctly superior to P.T. "Cellophane" for keeping eggs in good condition.

3. Condensation and retention of cold are much greater in cases lined with either P.T. or M.T. "Cellophane" than in unlined cases where eggs are removed from cold storage to room conditions.

RECOMMENDATIONS

1. To check the importance of the danger supposedly inherent in condensation which is held on the surface of an egg by running tests during warm weather.

* The word "Cellophane" is a registered trade-mark of the Du Pont Cellophane Company, Inc., 350 Fifth Avenue, New York, N. Y.

NOTE:- "M.T." indicates Moistureproof Transparent and "P.T." indicates Plain Transparent when used to describe kinds of "Cellophane."

IOWA CORN YIELD INCREASED BY DUST TREATMENT TESTS CONDUCTED OVER A PERIOD OF YEARS SHOW

EDITOR'S NOTE:- This is a summary of Extension Circular 221, April, 1936, titled "Dust Treatments for Seed Corn Diseases" by R. H. Porter and D. V. Layton, Iowa State College Extension Service, R. K. Bliss, Director, Ames, Iowa. Work being carried on by this college is recognized as highly important to agriculture and the circulars and other literature issued contribute importantly to efficiency and economy in farming.

Moldy ears of corn which are more abundant in some seasons than in others are familiar to every farmer. Few realize, however, that healthy-appearing ears may be infected with the same organisms that cause the noticeably moldy ears. Seed corn produced in Iowa is almost never entirely free from parasitic organisms which may so affect the germination as to cause dead kernels, blighted seedlings and retarded growth. Planting diseased seed corn reduces the stand and the yield.

The organisms which are probably of major importance are those that cause Diplodia, Basisporium, and Gibberella dry rots. Other organisms of minor importance are species of Fusarium, Rhizopus, Aspergillus and Mucor.

It is not unusual to find 10 to 20 percent of the seed corn in Iowa infected with dry rot organisms which may be external or internal, depending on such factors as the time of infection, moisture content and resistance of the kernels, and the temperature and humidity of the atmosphere during and after the time of infection. Detection of diseases carried by seed corn is practically impossible without the aid of the germinator and the microscope.---

Nearly disease-free seed may be secured by making an individual ear test and discarding the diseased ears. This method is tedious and time-consuming. Other methods which usually help to reduce the amount of disease in seed corn are (1) early field selection, (2) rapid drying, (3) proper storage, and (4) seed treatment.

Early Field Selection of Seed

Seed selection in the field before frost has three advantages: (1) It usually results in a high percentage of ears relatively

Continued on next page

free from dry rots, (2) it provides an opportunity to select the parent from which the seed ear is gathered, and (3) it can eliminate the possibility of frost injury.---

Drying the Seed

Dry rot parasites will continue to grow in seed corn after it is gathered until the moisture content is reduced below 15 percent. This is especially true during periods of high temperature and high humidity immediately following the time that the seed is picked. If the seed is dried as soon as gathered, further growth of dry rot parasites is largely prevented.---

Storing Seed Corn

Good seed corn is often injured by improper storage. Seed which is well dried and then hung in a crib or driveway may absorb more moisture in the fall and winter, allowing organisms to grow or rendering it subject to serious injury from low winter temperatures. Corn with a moisture content below 15 percent will stand a temperature of--5°F., but corn hung in a crib or shed is always in danger.---

Germination Tests. Even though seed has been gathered early, dried and properly stored, the safest policy is always to make a preliminary germination test each year during February or March.---

Seed Treatment

The fourth important practice in providing good seed corn is to treat the seed with any one of three mercury dusts now on the market. In most cases good treatment will give a more uniform stand and also result in an increase in yield ranging from 1 to 15 bushels per acre, depending on (1) seasonal conditions, (2) time of planting, and (3) condition of the seed used. It should be clearly understood that seed treatment is not a substitute for good seed, but because most open-pollinated and hybrid lots of seed corn carry dry rot organisms, seed treatment is recommended as an important agricultural practice which accomplishes three things described below:

1. Seed Treatment Increases the Stand and May Prevent Replanting

Often a high percentage of farmers' planter box seed corn is infected with dry rot organisms which grow on the sprouting kernels and either kill or weaken the seedlings. ---

Field tests with planter box corn during the past 9 years have shown that treatment increases stands about 4 to 5 percent, on the average. In some cases the increase may be 25 percent. The better the seed, the less the increase in stand resulting from treatment.---

Continued on next page

2. Seed Treatment Increases the Yield

The real measure of the value of seed treatment is its effect on the yield of farmers' seed corn. For 9 years a series of yield tests has been conducted in several counties of Iowa for the purpose of determining the actual effect of seed treatment. Plots were planted by hand and also with a corn planter. Seed samples were obtained from farmers who had previously prepared them for planting. The average gain from treatment each year is given below:

VALUE OF SEED TREATMENT OF CORN

Year	No. plots	No. dusts used	Average gain from treatment
1927	18	2	4.0 bu. per acre
1928	28	4	2.8 " " "
1929	22	3	4.4 " " "
1930	23	3	3.3 " " "
1931	28	3	4.0 " " "
1932	26	3	5.1 " " "
1933	6	3	2.9 " " "
1934	3	3	3.2 " " "
1935	2	1	6.3 " " "

Average for 9 years--4.0 bushels per acre.

In many cases yield increases have been 9 bushels per acre, in several instances 15 bushels, in one case 20 bushels and in others only 1 or 2 bushels. With some samples no increase was secured. Several factors determine the effect of treatment of which (1) time of planting, (2) amount of disease in the seed corn, and (3) condition of the soil are most important. Since soil and weather conditions cannot be predicted it is wise to use a dust treatment every year as a form of insurance. The value of the gain in yield over a period of years will far exceed the cost of treatment.

3. Seed Treatment Permits Earlier Planting

Treated seed will remain alive longer in the soil than will non-treated seed of the same kind. This insurance against seedling blights makes it safer to plant a few days earlier in May. A few days gain in time to a farmer who has a large acreage may mean considerable difference in the quality and yield of the succeeding crop.---

Cost of Treatment. The cost of the dusts now on the market is $1.00 per pound. One pound will treat 8 bushels of seed which will plant from 45 to 55 acres. The cost per acre therefore is between 2 and 3 cents. If the increase in yield per acre is only 2 bushels, the treatment will be paid for several times.

Continued on next page

How to Treat and Dusts to Use.--- There are three commercial dusts on the market at present which are recommended for use on seed corn. They are Merko, New Improved Semesan, Jr., and Barbak III.---

Cautions

All of the dusts listed above are poisonous. It is best to wear either a sponge, a handkerchief or a respirator over the nose and mouth while treating seed. Do not use an excess of dust.

"Semesan" is a trade mark registered in the U. S. Patent Office by the Bayer-Semesan Company, Wilmington, Delaware.

NEW INDUSTRIAL USES FOR AGRICULTURAL COMMODITIES HOPEFULLY EXPECTED BY THE FARM CHEMURGIC COUNCIL

EDITOR'S NOTE:- The Second Dearborn Conference of Agriculture, Industry and Science, sponsored by the Farm Chemurgic Council, was held in Detroit, Michigan, May 12 to 14, inclusive. Owing to the large attendance, it was necessary to transfer the Conference from Dearborn to Detroit.

The fact that impressed one observer most at the Second Dearborn Conference of Agriculture, Industry and Science was that the work of the Farm Chemurgic Council is motivated by the sound economic principle of production for profit; profit for the grower of raw stuffs suitable for manufactures--particularly industrial chemical kinds -- and profit for the processors of products of the soil.

As set forth in an official statement: "The Farm Chemurgic Council entertains the commendable hope that its activities will: (1) result in the gradual absorption of much of the domestic farm surplus by domestic industry, (2) put idle acres to work profitably, (3) increase the purchasing power of the American farmer on a stable and more permanent basis, and thereby, (4) increase the demand for manufactured products, and, thus, (5) create new work for idle hands to do; revive American industry; restore American labor to productive enterprise, and relieve the economic distress of the Nation."

Exhibits at the Conference demonstrated, and certain of the discussions disclosed, that science and industry are more and more producing new products from staple farm crops. Some, it is true, are designed to supplant manufactured products long in use. It is significant, however, that many of the products are entirely new and different ones, demand for which arises from modern human needs. This latter group consists of products to meet the requirements created by a higher standard of living. Still other products contribute to America's growing economic independence.

A Look Into the Future for Agriculture

In "a forecast of what might be accomplished in ten years if man set himself to the task," the Farm Chemurgic Council lists the projects and new acres that could be utilized, as follows: power alcohol, 21,000,000; paper and paper stock, 8,000,000; vegetable fibres, 5,000,000; flaxseed and linseed, 3,500,000; cotton for road construction, 3,000,000; plastics (miscellaneous), 3,000,000; soy bean plastics, 2,000,000; tung oil, 1,000,000; tanning materials, 500,000; soy bean oil, 500,000; starch, 500,000, and miscellaneous new products, 2,000,000; a total of 50,000,000 acres.

Continued on next page

Patently, the estimate of the Farm Chemurgic Council, as a whole and aside from whether expectations will be realized in a particular case, is not an extravagant one. This, in view of the fact that during hardly more than a decade a single manufacturer of diversified chemical products, E. I. du Pont de Nemours & Company, has steadily increased its consumption of farm products until now it is using agricultural commodities grown on more than 4,000,000 acres of American farm lands.

The du Pont Company each year uses an average of 16,500,000 pounds of staple cotton, 700,000 pounds of cottonseed oil, 6,500,000 pounds of turpentine and rosin, 36,000,000 pounds of cotton linters, corn products from 36,000,000 bushels of corn, and vegetable oils--other than cottonseed oil -- to a total of 23,000,000 pounds.

A Speaker Sounds a Warning Note

While a spirit of optimism pervaded the Conference, Dr. Charles M. A. Stine, vice president of the du Pont Company, warned against a movement that well could put the entire Farm Chemurgic program in the discard. Dr. Stine said, in part: "Proposals have been seriously made that we close our laboratories and discharge every scientist who is seeking to better industrial practices and products, in short that science and invention be forcibly suspended until the rest of the working world can catch up with them. But even Soviet Russia has learned that progress is not to be evoked through the pronunciamentos of the most unchallenged dictatorship. Moreover, Russia has convinced herself that a nation that suppresses science in industry in this modern world is lost.

"To me it seems that we have gone too far in the past century, and especially during the past twenty years, to suspend science in industry so much as a day. Hundreds of industrial operations are absolutely dependent for success upon the most constant and painstaking technical supervision. Chemistry, metallurgy, the electrical, telephone and radio industries, would be paralyzed if their scientists were placed on an enforced 'vacation'. It is as ridiculous to talk of suspending science as it would be to talk of shutting down all power plants and forcing hand labor as a means of putting unemployed men back to work.

"It would be equally dangerous to suspend only that portion of research work carried on by the research laboratories of industry. Throughout the civilized world, nations are striving for self-sufficiency on the one hand and scientific supremacy on the other. In practically all the great powers, excepting the United States alone, this scientific effort is regarded as of such vital importance that it is given substantial public aid."

Continuing his denunciation of the "science holiday" proposal, Dr. Stine asserted: "Stop industrial research in America, or even

Continued on next page

cripple and hamper it by laws that would dry up its supporting funds, and a world drive for the economic conquest of this richest of all lands would be under way immediately."

In concluding his address, Dr. Stine said: "Let us see to the use of more fundamental as well as of applied research in industry, as one sure means of assisting in determining the kind of a future our industries may confidently expect. Further, let us recognize that sustained effort in fundamental research, especially in chemical research, while undoubtedly yielding results of direct application to agriculture, will assuredly lead to new processes and products which may be of more vital importance to the farmer than the results obtained by those investigators working strictly within the agricultural field. And the order is: First, Fundamental Research; Second, Pioneering Applied Research; Third, reduction to Economic, Successful, Manufacturing Practice."

NOTE: Dr. Stine is a member of the Governing Board of the Farm Chemurgic Council.

CLEANING OUT SOFT MUD FROM DITCHES IN MARSHES DONE SUCCESSFULLY BY A NEWLY-DEVELOPED METHOD

EDITOR'S NOTE:- The method of cleaning out ditches, described here, is indicative of the progress being made by agricultural engineers in the development of new ways to use dynamite for drainage purposes.

By L. F. Livingston, Manager,
Agricultural Extension Section,
E. I. du Pont de Nemours & Co.

Nothing in connection with the use of explosives for making ditches has been more conclusively demonstrated than that the wetter the ground is, the easier it is to blast. This is by reason of the fact that water is essential to the travel of the detonation wave, set up by the explosion of the initial charge, from charge to charge in propagated blasting. Ordinarily, this is also the case in cleaning out ditches, since the work is usually done by the propagated method. There are, however, times when difficulty is experienced if clean-out work by one of the usual methods is attempted. Such a time is when there is too much water, with the result that the material to be blasted is excessively soft to considerable depth.

Where the material to be removed in a clean-out operation is more or less solid, it can be blown out by loading the dynamite in holes in the center of the ditch; this, irrespective of the type of soil. But where the mud is loose, soft or semi-liquid, the ordinary method of loading can not be depended upon unless the bottom and the sides of the ditch are very firm.

In low marsh land, especially in coastal localities where the soil is unstable to a great depth, it follows that the bottom and the sides of a ditch are anything but solid. For that reason, loading in the center should be avoided if the mud to be cleaned out is soft. The result of the blast is that the soft material is not thrown clear of the ditch, while frequently the sides are broken loose.

An Improved Loading Method

Various methods of loading for cleaning out ditches in very soft marshy areas have been tried by agricultural engineers and practical blasters, but in the past none had proved very satisfactory. However, recent experimental work indicates that when the dynamite

Continued on next page

is loaded in a line close to one side of the ditch, the blast will scoop out the soft material and throw it in the direction of the opposite side. At the same time, the ditch is usually widened by the breaking away of the bank back of the line of holes.

While the work done up to this time by the method outlined has been very satisfactory, it is to be understood that a standardized practice has not yet been developed. At present the proper location of the line of holes in relation to the edge of the ditch can only be determined by trial shots. Similarly, there are no definite data on the quantity of dynamite to use or other details.

The results obtained by the limited experimentation which has been carried on offers promise of the eventual development of means whereby any experienced blaster may do clean-out work in marshy soil successfully.

NOTE: Inquiries addressed to the Agricultural News Letter will receive attention.

########